REMARKS

Reconsideration of the present application is respectfully requested. Claims 1, 11 and 17 have been amended. Claims 21-26 are newly added. No claims have been canceled. No new matter has been added.

Claims 1-20 stand rejected under 35 U.S.C. § 102(e) based on U.S. Patent no. 6,247,077 of Muller et al. ("Muller").

In general, the present invention relates to a self-contained storage management device that is connected between multiple host computers and multiple physical storage devices on a storage area network (SAN). Among other advantageous features, the device centralizes the management layer in the SAN. Accordingly, the device includes (among other features) tools for discovering the topology and other attributes of the SAN and automatically detecting changes to the topology.

Claim 1, as amended, recites:

> 1. (Currently amended) A storage management device for exchanging data between a plurality of computers that are external to the storage management device and a plurality of storage devices that are external to the storage management device, the storage management device comprising:
>
> one or more control modules, **each having one or more first data ports;**
>
> one or more storage control modules, **each having one or more second data ports;**
>
> one or more data stores;
>
> a switch fabric configured to selectively exchange data among said first data ports and said second data ports, some of said first data ports and said second data ports **to communicate data with said computers that are external to the storage management device**, others of said first data ports and said second data ports **to communicate data with said storage devices that are external to the storage management device;**
>
> first program code adapted to execute on each of said one or more control modules, and
>
> second program code adapted to execute on each of said one or more storage control modules,

said first program code comprising:

a first code component configured to operate one of said control modules to issue a request for device information;

a second code component configured to operate one of said storage control modules to receive said request for device information and in response thereto to obtain device information corresponding to one or more of said one or more storage devices, said device information being stored in said one or more data stores; and

a third code component configured to operate one of said control modules to receive said device information and in response thereto to initialize, characterize, and profile said corresponding storage devices. (Emphasis added.)

Applicant has amended claim 1 to make it more clear that, while the recited "control modules" and "storage control modules" are elements of the claimed device, the recited "computers" and "storage devices" are *external to* the claimed device.

In contrast with claim 1, Muller does not disclose or suggest a storage management device which has one or more control modules, each having one or more first data ports, and one or more storage control modules, each having one or more second data ports, where some of the first and second data ports are to communicate with *external* computers and some of them are to communicate with *external* storage devices. This is not surprising, since Muller is not directed to a self-contained storage management device as the present invention is.

In the Office Action, the Office considers the compute nodes in Muller to read on the "one or more control modules" in claim 1. The Office also considers the I/O nodes ("IONs") 212, 214 in Muller to read on the "one or more control modules" in claim 1. However, in Muller the compute nodes 200 are the *host computers* of that system. If the compute nodes 200 in Muller are interpreted as the control modules of claim 1, i.e., if they are considered elements of the claimed "storage management device", then Muller does not disclose any *external computers* with which said control modules can communicate, as required by claim 1. Therefore, the compute nodes in Muller cannot be read on the recited "one or more control modules" of claim 1.

Similarly, if the IONs 212, 214 in Muller are interpreted as the storage control modules of claim 1, i.e., if they are considered elements of the claimed "storage management device", then

Muller does not disclose any *external storage devices* with which said storage control modules can communicate, as required by claim 1. Therefore, the IONs in Muller cannot be read on the recited "one or more storage control modules" of claim 1.

For at least these reasons, therefore, claim 1 and all claims which depend on it are patentable over the cited art.

Claim 11, as amended, recites:

> 11. (Currently amended) A method implemented in a storage management device for exchanging data between a plurality of computers that are external to said storage management device and a plurality of physical storage devices that are external to said storage management device, the storage management device comprising a plurality of first data ports configured for communication with said computers, a plurality of second data ports configured for communication with said physical storage devices, and a switch fabric configured to selectively exchange data among said first data ports and said second data ports, the method comprising:
>
> communicating a request for device information;
>
> obtaining device information corresponding to said physical storage devices that are external to said storage management device;
>
> based on said device information, initializing said corresponding physical storage devices;
>
> identifying a plurality of first communication paths between said storage management device and said physical storage devices;
>
> storing in one or more data stores said device information and path information indicative of said first communication paths;
>
> receiving **user-provided information** relating to virtual storage configuration;
>
> and
>
> **based on said device information, said user-provided information and said path information, associating one or more of said physical storage devices to said virtual storage configuration.** (Emphasis added.)

Claim 11 has been amended in manner similar to claim 1 and, therefore, is patentable over the cited art for reasons similar to those discussed above (at least).

In addition, Applicants find no disclosure or suggestion in Muller of, per claim 11, associating one or more physical storage devices to a virtual storage configuration based on device information (corresponding to physical storage devices that are external to the storage

management device), *user-provided information* relating to the virtual storage configuration, and path information indicative of communication paths between the storage management device and the physical storage devices.

The Office Action cites Muller at col. 45, lines 11-21 as disclosing essentially this functionality (Office Action, p. 7). However, Applicants can find no disclosure or suggestion in that section of a storage management device receiving *user-provided information* relating to a virtual storage configuration, much less using it to associate one or more physical storage devices to a virtual storage configuration. Further, Applicant can find no disclosure or suggestion anywhere in Muller of associating one or more physical storage devices to a virtual storage configuration based on device information (corresponding to physical storage devices that are external to the storage management device), user-provided information relating to virtual storage configuration, *and* path information indicative of communication paths between the storage management device and the physical storage devices.

For at least these reasons, therefore, claim 11 and all claims which depend on it are patentable over the cited art.

Claim 17, as amended, recites:

> 17. (Currently amended) A storage management device for exchanging data between a plurality of computers that are external to said storage management device and a plurality of physical storage devices that are external to said storage management device, the storage management device comprising:
>
> a plurality of first data ports configured for communication with said computers that are external to said storage management device;
>
> a plurality of second data ports configured for communication with said physical storage devices that are external to said storage management device;
>
> a switch fabric configured to selectively exchange data among said first data ports and said second data ports;
>
> one or more data stores;
>
> means for communicating a request for device information;
>
> means for obtaining device information corresponding to said physical storage devices and for storing said device information in said one or more data stores;

means for characterizing and profiling said physical storage devices based on said device information;

means for initializing said corresponding physical storage devices based on said device information;

means for identifying a plurality of first communication paths between said storage management device and said physical storage devices and for storing information indicative of said first communication paths in said one or more data stores; and

means for **automatically detecting and characterizing changes in a topology of said physical storage devices** and for storing said changes. (Emphasis added.)

Claim 17 has been amended in manner similar to claim 1 and, therefore, is patentable over the cited art for reasons similar to those discussed above (at least).

In addition, Applicants find no disclosure or suggestion in Muller of, per claim 17, means for *automatically detecting and characterizing changes in a topology of physical storage devices.* The Office Action cites Muller at col. 45, lines 32-51 as disclosing essentially this functionality (Office Action, p. 7). The closest disclosure Applicants can find to this claim limitation is at col. 45, lines 40-43, where Muller states, "Dipoles 226 use this "self discovery" technique to detect and correct virtual disk naming inconsistencies that may occur when dipoles 226 are added or removed from an active system." However, merely detecting and correcting a *naming inconsistency* with regard to *virtual* devices, which results from adding or removing an I/O node, is not the same as, nor any suggestion of, detecting *and characterizing* a change in the topology of *physical* storage devices per claim 17.

For at least these reasons, therefore, claim 17 and all claims which depend on it are patentable over the cited art.

New claim 21 recites:

21. (New) A storage management device for use on a storage network, the storage management device comprising:

one or more control modules, each having one or more first data ports;

one or more storage control modules, each having one or more second data ports;

a switch fabric to selectively exchange data among said first data ports and said second data ports, some of said first data ports and said second data ports to communicate data with a plurality of computers that are external to the storage management device, others of said first data ports and said second data ports to communicate data with a plurality of storage devices that are external to the storage management device;

logic to cause the storage management device to determine a baseline inventory of a topology of the storage network at different points in time; and

logic to generate a report indicating differences in the baseline inventory of the topology between two or more of said points in time. (Emphasis added.)

Claim 21 includes limitations similar to those added to claim 1 and, therefore, is patentable over the cited art for reasons similar to those discussed above (at least).

In addition, Applicants do not find in Muller any disclosure or suggestion of, per claim 21, a storage management device which includes logic to determine a baseline inventory of a topology of the storage network at different points in time, and to generate a report indicating differences in the baseline inventory of the topology between two or more of said points in time. Support for this limitation can be found in Applicant's description as filed in, e.g., paragraphs [51] and [52].

For at least these reasons, therefore, claim 21 and all claims which depend on it are patentable over the cited art.

New claim 22 recites:

22. (New) A storage management device for use on a storage network, the storage management device comprising:

one or more control modules, each having one or more first data ports;

one or more storage control modules, each having one or more second data ports;

a switch fabric to selectively exchange data among said first data ports and said second data ports, some of said first data ports and said second data ports to communicate data with a plurality of computers that are external to the storage management device, others of said first data ports and said second data ports to communicate data with a plurality of storage devices that are external to the storage management device;

logic to obtain device information corresponding to one or more of said one or more storage devices, **wherein said device information includes reliability information, availability information, a failover policy, command support capability, *and* performance information**; and

logic to receive said device information and in response thereto to initialize, characterize, and profile said corresponding storage devices. (Emphasis added.)

Claim 22 includes limitations similar to those added to claim 1 and, therefore, is patentable over the cited art for reasons similar to those discussed above (at least).

In addition, Applicants do not find in Muller any disclosure or suggestion of, per claim 22, a storage management device which includes logic to obtain device information corresponding to one or more storage devices, wherein the device information includes reliability information, availability information, a failover policy, command support capability, *and* performance information.

Note that this limitation is also recited in new dependent claims 24-26 and is similar to what is recited in dependent claims 9, 12 and 20. Support for this limitation can also be found in Applicants' description as filed in, e.g., paragraphs [95] – [101].

In rejecting dependent claims 9, 12 and 20, the Office cited Muller at: col. 25, Table VIII (allegedly disclosing reliability information and availability information); col., 9, lines 65-67 and col. 10 lines 29-31 (allegedly disclosing failover policy information); col. 24, lines 3-11 (allegedly disclosing command support information);; and col. 17, lines 20-23 (allegedly disclosing performance information); (see, e.g., Office Action at pages 5, 7 and 10).

Applicants do not find any disclosure or suggestion in Muller, however, of a storage management device obtaining *device information including* (among other things) a *failover policy.* Muller mentions that two halves of an ION dipole are attached to a common set of disk devices (col. 9, line 65 to col. 10 line 3). That is an approach to failover; however, it is not any suggestion of a storage management device *obtaining information on* a failover policy, as recited in claims 22 and 24-26. (Note that Applicants' silence regarding the other types of

device information recited in claims 22 and 24-26 does not represent or indicate agreement with the Office's interpretation.)

In addition, regarding new dependent claim 23, Applicants do not find any disclosure or suggestion in Muller of a storage management device obtaining reliability information indicating whether a storage device is a RAID device or a non-RAID device. Support for this limitation can be found in Applicants' description as filed in, e.g., paragraph [96].

Other Dependent Claims

In view of the above remarks regarding the independent claims, a specific discussion of the dependent claims is considered to be unnecessary. Therefore, Applicants' silence regarding any dependent claim is not to be interpreted as agreement with, or acquiescence to, the rejection of such claim or as waiving any argument regarding that claim.

Conclusion

For the foregoing reasons, the present application is believed to be in condition for allowance, and such action is earnestly requested.

If there are any additional charges/credits, please charge/credit our deposit account no. 02-2666.

Respectfully submitted,
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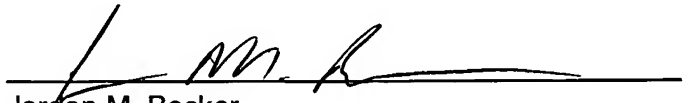

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